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ABSTRACT

A study determined if relationships exist between learning styles and academic achievement and brain hemispheric dominance and academic performance in the courses of principles of management, business law, intermediate accounting, and principles of economics. All second-year accounting students (64 students) at Northeast Iowa Community College from 1988 to 1991 took the Kolb Learning Style Inventory to determine their learning styles and the McCarthy Hemispheric Mode Indicator to discover whether students were right-brained, left-brained, or whole brained. Academic achievement was measured by the students' final grade point averages earned in the courses. Direct and inverse tendencies seemed apparent between particular learning styles and academic achievement. In brain dominance, direct and inverse tendencies appeared to exist between certain brain hemispheric modes and academic achievement. Findings suggest that post-secondary business and accounting instructors should consider testing their students to determine students' learning styles and brain hemispheric dominance so that the instructors may suggest study approaches and methods that may increase academic achievement. (Contains 16 references and nine tables of data. The learning style inventory and brain hemispheric mode instrument, and a description of four learning styles are attached.) (Author/RS)

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ED 374 412

# Relationships Between Learning Styles and Academic Achievement and Brain Hemispheric Dominance and Academic Performance in Business and Accounting Courses

A Thesis

Joseph H. Carthey

Winona State University

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Relationships Between Learning Styles and Academic Achievement and Brain Hemispheric Dominance and Academic Performance in Business and Accounting Courses

An Abstract of a Thesis

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ABSTRACT

The purpose of this study was to determine if relationships exist between learning styles and academic achievement and brain hemispheric dominance and academic performance in the courses of Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics (Macro and Micro).

All second-year accounting students (64 students) at Northeast Iowa Community College from 1988-1991 were the subjects and the population for the study. At the beginning of their second year, all students took the Kolb Learning Style Inventory (LSI) to determine their learning styles and the McCarthy Hemispheric Mode Indicator (HMI) to discover whether the students were right-brained, left-brained, or whole brained. Learning styles were defined by the categories included in Kolb's LSI: Diverger, Assimilator, Converger, and Accommodator. Academic achievement was measured by the students' final grade point averages earned in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics.

The literature search did not yield any studies determining relationships between learning styles as measured by Kolb's LSI and academic achievement and brain hemispheric dominance as measured by McCarthy's HMI and

academic performance in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics courses.

Population raw figures and percentages by grade earned (A, B, C, D, F) were used in the study to detect tendencies between the variables. Direct and inverse tendencies seemed apparent between particular learning styles and academic achievement in the courses included in the study. In brain dominance, direct and inverse tendencies appeared to exist between certain brain hemispheric modes and academic achievement in the courses included in the study.

The implications of the study are that post-secondary business and accounting instructors consider testing their students using the Kolb LSI and the McCarthy HMI to determine students' learning styles and brain hemispheric dominance, respectively. This information may be useful to individual instructors in counseling their students. For instance, instructors may suggest study approaches and methods that may increase academic achievement in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics.

This Study by: Joseph H. Carthey

Entitled:

Relationships Between Learning Styles and Academic Achievement and Brain Hemispheric Dominance and Academic Performance in Business And Accounting Courses

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# CHAPTER I

## THE PROBLEM

Instructors and teachers are interested in how the instructor-student learning process works. Of interest over the past twenty-five years was the emerging study of how student learning styles and brain hemisphericity affected learning process and academic performance. More specifically, instructors in post-secondary educational institutions are interested in determining whether certain variables such as learning styles related to academic achievement, or how brain hemispheric dominance related to academic performance in coursework included in specific degrees. On a micro level, different courses--like economics--required different brain processing skills. Thus, learning styles may be related to academic performance, and brain hemispheric dominance may be related to academic achievement as measured by the grades achieved in individual courses.

Gregorc (cited in Butler, 1985, p. 6) defined learning styles as:

> Consisting of distinctive and observable behaviors that provided clues about the mediation abilities of individuals' characteristic sets of behavior that told us how their minds related to the world, and therefore, how they learned.

These characteristic sets of behavior reflected specific mind qualities such as abstract versus concrete perception, active versus reflective processing, deductive versus inductive processing, and separate versus associative relationships. Mind qualities like these served as mediators as students learned and acted upon the world around them.

The human brain is divided in two "hemispheres." Levy (as cited in McCarthy, 1987) noted that people are a two-brained species each having their own special mind. "The two halves of the brain, right and left hemispheres, processed information differently" (McCarthy, 1987, p. 70). Left-brained individuals were analytical and determined solutions by dividing a problem into its parts. They liked verbal instructions, sequence, structure, and rationality. Right-brained individuals favored visual-spatial pictures, beauty, and "the big picture." They were fluid and spontaneous, and liked random patterns and intuition (McCarthy, 1987, p. 78).

If tendencies are evident between academic achievement and learning styles or final grade point averages and brain hemispheric dominance, then teaching style can be varied by the instructor to suit learning styles of individual students. For instance, if a student learned better by hands-on activities, an instructor can provide that kind of

learning experience, such as a practice set, to accommodate the student's learning style preference. In addition, an instructor can use the information to help a student achieve his/her academic goals by advising his/her of study approaches that may improve his/her academic performance.

## Statement of the Problem

The purpose of this study was to determine if tendencies exist between learning styles and the final grades earned in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics and brain hemispheric dominance and academic performance in the courses under study.

If tendencies between the variables appeared to exist, an instructor can develop new teaching approaches to fit students' learning styles better or to advise students of new study techniques that may enhance their academic performance in a given course.

Specifically, the objective of this study was to provide answers to the following specific research questions:

1. Are post-secondary accounting students' learning styles related to grade performance in each specific course of Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics?

2. Are post-secondary accounting students' brain hemispheric dominance related to grade results in each specific course of Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics?

Reasons for selection of post-secondary accounting students and the specified courses are found in Chapter 3, the "Methods and Procedures," section of this thesis.

## Significance of the Study

The goal of this study was to determine if tendencies exist between student learning styles and academic performance and brain hemispheric dominance and academic achievement in specific courses which instructors can use to advise students better, or develop more effective teaching methods to improve students' academic results in those courses. This initial study was undertaken to determine if additional research was warranted regarding learning styles and academic performance and brain hemispheric dominance and academic achievement in individual business and accounting courses. If study results indicated tendencies between the variables, further research may include testing accounting students at other community colleges or four-year colleges and universities for learning styles and brain hemispheric dominance to determine whether either is significantly

related to academic achievement in business and accounting courses.

## Assumptions

Basic assumptions relevant to the study included:

1. That second-year accounting students properly completed the Kolb Learning Style Inventory, as shown in Appendix A, and the McCarthy Hemispheric Mode Indicator, as shown in Appendix B, so test results accurately reflected each student's learning style and dominant brain hemisphere.

2. That the Kolb Learning Style Inventory (Kolb, 1985) and McCarthy Hemispheric Mode Indicator (McCarthy, 1986) accurately measured learning style preference and brain hemispheric dominance respectively.

## Limitations of the Study

1. This research study tested the complete population of second-year accounting students at Northeast Iowa Community College (NICC) for the years 1988-1991. Thus, the results were not subject to generalizations beyond the population selected.

2. Only tendencies between the learning style variables or brain hemispheric variables and academic performance variable were measurable--not causality. The subjects of the study (NICC second-year accounting students) came to the

study with pre-existent learning styles and brain hemispheric tendencies.

## Operational Definitions

For purposes of this study the following terms are used:

### Learning Style

McCarthy (1987, p. 3) stated, "There were two major differences in how individuals learned . . . the first is how we perceived, the second is how we processed." Perceiving was how the brain received data. It was the means through which an individual grasped information (Butler, 1987). In this study perceiving was divided into a primary dichotomy of concrete versus abstract perception. Individuals who perceived concretely sensed or felt the actual reality of the experience. They connected the experience itself to meaning and submerged themselves in the concrete reality of the experience using their senses and intuition to gather data (McCarthy, 1987). Butler (1985, p. 8) noted that ". . . the perception quality of concreteness permitted us to experience and to understand the physical world, as well as to express ourselves in physical media."

Individuals who perceived abstractly analyzed and thought through their experience intellectually. They reasoned their experience and perceived it using a logical

approach. They stood outside their experience and separated their personality from it (McCarthy, 1987). Butler (1985, p. 8) stated, "Through our abstraction abilities, we appreciated aesthetics, experienced emotions, understood relationships, conceived ideas, analyzed concepts, lived vicariously, and knew God."

Processing was the second major dimension of learning. After perception occurred, the brain processed the information it received. As the brain processed new information and experiences, learners integrated the meanings of this information and experiences into their own lives' relevance. Individuals either processed information actively by doing or reflectively by watching. Active processors took new information and acted on it immediately by trying it out and reflecting on it. Reflective processors thought about new information and experiences, filtered them through their own experiences and created new associations (McCarthy, 1987). Thus, the perceiving versus processing dichotomy was brought together to form four different learning styles as defined by Kolb (1985) in his Learning Style Inventory, as shown in Appendix B.

The learning style variable was reduced to a nominal scale of four styles of learning. Students were classified as either Type 1, 2, 3, or 4 depending upon their scores on the Kolb Learning Style Inventory (Kolb, 1985). Each type

of learning style was defined specifically by the kind of perceiving and processing that occurred as shown in Table 1.

**Table 1**

**KOLB LEARNING STYLES BY TYPE OF PROCESSING AND PERCEIVING**

| Learning Styles | Perceive | Process |
|---|---|---|
| Type 1 - Diverger | Concretely | Reflectively |
| Type 2 - Assimilator | Abstractly | Reflectively |
| Type 3 - Converger | Abstractly | Actively |
| Type 4 - Accommodator | Concretely | Actively |

Source: McCarthy, B. (1987). The 4 MAT System. (p. 24). Barrington, IL: Excel, Inc.

Type 1 learners perceived information concretely and processed it reflectively. Kolb (as cited in McCarthy, 1987) called them "Divergers," and they are considered sensors or feelers and watchers. Other individuals perceived experience abstractly and processed it reflectively. These individuals are called Type 2 learners or "Assimilators." Type 2 learners are considered thinkers and watchers. Type 3 learners were called "Convergers."

These individuals perceived abstractly and processed actively. They experimented with ideas, tested them, and saw how they worked; and thus, are thought of as thinkers and doers. Finally, Type 4 learners perceived experience concretely and processed it actively (McCarthy, 1987). Labeled "Accommodators," these individuals were sensors or feelers and doers. (See Appendix C for a more detailed description of Type 1, 2, 3, and 4 learning styles).

Brain Hemispheric Dominance

Bogen (as cited in McCarthy, 1987) noted, "The Concept of Hemisphericity described the individual learner's preference for using one side of the brain and its processing mode over the other." However, both the left and the right sides of the brain were of equal importance. Each side possessed its own unique characteristics. The McCarthy Hemispheric Mode Indicator (McCarthy, 1986) categorized the brain hemispheric variable into three classifications: right mode, whole brained, and left mode, as shown in Appendix B.

Visual processing occurred on the right side of the brain. Deutsch and Springer (1989, p. 6) noted, "The right hemisphere appeared to be responsible for certain spatial and musical abilities and to process information simultaneously and holistically." Processing of emotional information and production of emotional expressions occurred

on the right side of the brain. Right-brained individuals saw the "big picture" and beauty. They were fluid and spontaneous, and liked random patterns and intuitive judgments (McCarthy, 1987). Researchers felt the right-side of the brain was also responsible for creativity and synthesizing (See Appendix B for additional descriptions of right mode processing).

Individuals who are "whole brained" processed new information and experiences equally well on either side of the brain, but may slightly favor one side over the other. McCarthy (1987, p. 82) noted, "Wholebrainedness seemed to be a preference for approaching learning experiences and opportunities with a flexibility and fluency for both types of processing strategies."

Logical and rational thinking characterized the brain's left side. Deutsch and Springer (1989, p. 6) stated, "The left hemisphere has been found to be predominantly involved with analytic processes, especially the production and understanding of language, and it appeared to process input in a sequential manner." Left-brained individuals solved problems by breaking down problems into their component parts. Discrete and objective processings occurred on the brain's left side as well (McCarthy, 1987). When left-brained individuals read, they read in detail and analyzed

carefully all the information received. (See Appendix B for additional descriptions of left mode processing).

The brain dominance variable was measured by the score achieved by each student on the McCarthy Hemispheric Mode Indicator (McCarthy, 1986). The score indicated the respondent's brain hemispheric dominance (i.e., left, right, or whole).

Academic Achievement

Academic achievement was defined as a student's grade point average (GPA) using assigned letter grades A-F. For purposes of this study, each letter grade was assigned a corresponding GPA range as follows:

| Letter Grade | Corresponding GPA Ranges |
|---|---|
| A | 4.00 - 3.50 |
| B | 3.49 - 2.50 |
| C | 2.49 - 1.50 |
| D - F | 1.49 - 0 |

Each student's average final GPA was used for sequential courses like Business Law I and II, Intermediate Accounting I, II, and III, and Principles of Economics (Macro and Micro). The GPA for Principles of Management was the assigned course grade. Averaging GPAs for the sequential courses created the need for GPA ranges. In addition, the

grade distribution for NICC second-year accounting students was strongly skewed towards higher grades because this group represented the remaining 30% of all students who started NICC's accounting program and, thus, they were some of the best and brightest students at NICC.

# CHAPTER II

## Review of Literature

The purpose of this study was to determine if tendencies existed between learning styles and academic achievement and brain hemispheric dominance and academic performance in the courses of Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. Included in this chapter were the review of literature indicating past research in linking learning styles to academic achievement and brain hemispheric dominance to academic performance at the post-secondary level and how this study contributed to learning style and brain hemispheric research.

### Major and Program Level

Learning styles as identified by standardized tests called "Learning Styles Inventories" were not good predictors of academic success in professional programs according to two recent studies. Sparks (1990) sought to determine if the Kolb Learning Styles Inventory (Kolb, 1985) could be used to predict future academic success--as measured by overall grade point average--for optometry students. He determined that correlation between high-performing versus low-performing students and their learning

styles were not strong enough to warrant the use of the Kolb Learning Style Inventory (LSI) in the recruiting process for optometry students. Leiden, Crosby, and Follmer (1990) found the results of two learning style tests given to seventy-nine medical students at the University of Nevada School of Medicine were inadequate predictors of future academic success in the medical program.

However, in a study by Garvey and Bootman (1984) using the Kolb LSI (Kolb, 1985), a significant relationship was discovered between predominate learning style and overall grade point average in a pharmaceutical program.

The literature review yielded no studies indicating that any researcher has attempted to determine if tendencies exist between brain hemispheric dominance--as measured by a brain hemispheric mode indicator like McCarthy's (1986)--and academic performance at the program or major level.

## Individual Course Level

Learning style tests have varied according to the perspective researchers have taken. Four different perspectives in learning style theories have been popular. According to Duckwall, Arnold, and Hayes (1990, p. 4),

> One approach from cognitive and perception psychology envisioned learning styles as cognitive personality, where the focus was on basic learning processes or stable and fundamental individual

characteristics of perceiving, remembering, thinking, or problem solving.

Dimensions tested by this type of learning style inventory include field--independence versus dependence, memory, visualization, and conceptual differential, among others. Studies that linked these types of cognitive style factors to academic success were rare. Schwen and Bednor (1979) found no association between cognitive style factors and grade point average in an introductory Geography course. At the University of Missouri, Kansas City, Ritchey and Lashier (1981) discovered no relationship existed between Field Dependence-Independence cognitive style and academic achievement in a general Biology laboratory course using intelligence scores as a covariant. However, correlations existed between cognitive style variables and academic achievement using regression analysis in a physical science course and general chemistry course (Fazio and Zambotti, 1977).

A second perspective in learning style theory focused on instructional preferences of students and "learning experiences within the everyday learning environment" (Duckwall, et al., 1990, p. 5). Using their own learning style inventory to determine students' preference for collaborative, dependent, and independent learning and teaching styles, Wetzel, Potter, and O'Toole (1982) found significant relationships existed between learning styles

and teaching styles, and academic achievement--using regression analysis--in an introductory Economics course.

A third approach concentrated on information processing and instructional preference of students to learning, especially in medical education. The Inventory of Approaches to Learning (Ramsden, 1977) and the Short Inventory of Approaches to Learning (Entwistle, 1981) were the learning style inventories representing this information processing and instructional preference approach. These learning style inventories tested student learning preferences like achievement motivation, reproducing orientation, meaning orientation, operational learning, versatile style, pathological style, and prediction of study success (Duckwall, et al., 1990). Important relationships were discovered between the variables "achievement motivation" and "prediction of student success" and the students' grade point averages in college science courses in a study conducted at the University of Missouri-Kansas City School of Medicine (Duckwall, et al., 1990).

The fourth perspective in learning style theory centered on how individuals perceived and processed information. David A. Kolb pioneered this perspective of learning style theory (Duckwall, et al., 1990). The Kolb Learning Style

Inventory (Kolb, 1985) was the outgrowth of his work. This study involved the latter approach to define learning styles.

In the literature review no past or present studies correlated learning styles, as measured by the Kolb LSI, with academic achievement in individual business and accounting courses at the post-secondary level. No past or present studies in the literature review were found that indicated any researcher had yet related brain hemispheric dominance to academic achievement in business or accounting courses at the post-secondary level.

The current study broadened the research in determining whether tendencies exist between types of learning styles, as measured by a standardized learning style inventory along the dimensions of perceiving and processing, and students' grade performance in specific business and accounting courses at the post-secondary level.

In addition, this study attempted to determine if tendencies existed between brain dominance modes, as measured by a standardized hemispheric mode indicator, and students' grade point average in specific business and accounting courses at the post-secondary level. In the literature review, this appeared to be an initial study in relating brain hemispheric dominance to academic achievement in specific business and accounting courses.

# CHAPTER III

## Method and Procedures

The study's design, subjects, procedure, and data analysis are discussed in this chapter. The purpose of the study was to determine if relationships exist between learning styles and academic achievement and brain hemispheric dominance and academic performance in business and accounting courses at the post-secondary level. A literature review was one major method of data collection for the variables under study. Another major method of data collection included use of the Kolb Learning Style Inventory (Kolb, 1985) and McCarthy's Hemispheric Mode Indicator (McCarthy, 1986).

### Subjects

Second-year accounting students at Northeast Iowa Community College (NICC) for the years 1988-1991 were the subjects of this study. The population of second-year accounting students at NICC was selected because of the researcher's accessibility to the students' grades and inventory data. All subjects were tested using the learning style inventory and hemispheric mode indicator at the beginning of their second year of the accounting program at NICC. Use of the results of their learning style

inventories and hemispheric mode indicators were clearly explained to each student participating in the study. Sixty-two second-year accounting students took part in this study.

## Instruments

Two different test instruments were selected and given to students participating in this study: The Kolb Learning Style Inventory (Kolb, 1985) and the McCarthy Hemispheric Mode Indicator (McCarthy, 1986).

Several reasons led to the selection of the Kolb Learning Style (LSI) with which to test students (see Appendix A for a copy of Kolb's LSI). Kolb's LSI (Kolb, 1985) was selected because it was easy to give, grade, and interpret. It consisted of twelve questions with four possible responses that required students to self-assess their learning experiences into how they perceived information (concretely versus abstractly) and processed it (actively versus reflectively). The end result of taking the Kolb LSI was that each student discovered his/her predominate learning style.

The McCarthy Hemispheric Mode Indicator (McCarthy, 1986), as shown in Appendix B, was an inventory of thirty-two questions where all students were asked to make an assessment of how they perceive themselves. Each question

provided students with two self-descriptions and asked them to choose whether they were "a lot" or "somewhat" like one description or the other. Students could only choose one description. The hemispheric mode indicator, when completed, indicated to students whether they were right-brained, left-brained, or whole brained.

Each instrument's reliability has been established. Ferrell (cited in Sparks, 1990) established the reliability of the Kolb LSI. The content and concurrent validity and reliability of the McCarthy Hemispheric Mode Indicator were proven by Lieberman (1986).

## Procedure

All accounting students beginning their second year of course work at NICC were given the Kolb Learning Style Inventory and McCarthy Hemispheric Mode Indicator before any course work was begun. The original tests were retained on file for accessibility for this study.

Grades were collected for all second-year accounting students completing Intermediate Accounting, Principles of Economics, Business Law, and Principles of Management for the years 1988-1991 from grade books. Grades were submitted from Intermediate Accounting, Principles of Economics, Business Law, and Principles of Management courses in this study.

The sixty-two second-year accounting students who participated in this study were all taught by the same instructor for Principles of Management, Intermediate Accounting, Business Law, and Principles of Economics. Thus, any influence that a teaching style variable could have exerted on this study's results was controlled. Teaching style was found to have a significant relationship to academic achievement--using regression analysis--in an introductory Economics course (Wetzel, et al., 1982).

# CHAPTER IV

## RESULTS

This study was undertaken to determine if relationships existed between learning styles and academic achievement and brain hemispheric dominance and academic performance in the courses of Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. Answers to the questions posed in this study were sought through a literature review and by testing students using a learning style inventory and hemispheric mode indicator, and relating the tests' results to average final grades earned in the Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics courses. Results of student testing for learning styles and brain hemispheric dominance and relating them to final grades in the business and accounting courses under study are presented in this chapter.

Because the entire population of second-year accounting students at NICC was tested, the easiest and clearest means of displaying the results were through tables presenting student raw numbers and percentages by course grade. The first purpose of the study was to determine if tendencies existed between student learning styles and academic performance in certain business and accounting courses.

Students who were "Convergers" clearly possessed a grade performance advantage in all courses under study. (See Appendix C for a complete description of learning styles). This was interesting because the Converger learning style represented approximately 30 percent of the students who participated in the study and were the smallest number of students found in any learning style category. Those students having the "Diverger" learning style appeared to be disadvantaged compared to the other learning styles in scoring the higher grades of A and B. Convergers and Assimilators, who perceived new information and experiences abstractly, appeared to have greater numbers of A's than those students who perceived concretely (Divergers and Accommodators). In addition, those students who processed information actively by doing (Convergers and Accommodators) had the largest number of A's both in terms of raw scores and by percentage than those who processed information reflectively (Divergers and Assimilators).

**Table 2**

**GRADE PERFORMANCE BY LEARNING STYLE FOR PRINCIPLES OF MANAGEMENT**

**Grade Performance**

| Learning Style | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Diverger | 7.0<br>22.6% | 4.0<br>50.0% | ----<br>---- | ----<br>---- | 11 |
| Assimilator | 7.0<br>22.6% | 3.0<br>37.5% | 2.0<br>66.7% | ----<br>---- | 12.0 |
| Converger | 9.0<br>29.0% | ----<br>---- | ----<br>---- | ----<br>---- | 9.0 |
| Accommodator | 8.0<br>25.8% | 1.0<br>12.5% | 1.0<br>33.3% | ----<br>---- | 10.0 |
| Totals<br>% by Column | 31.0<br>100.0% | 8.0<br>100.0% | 3.0<br>100.0% | ----<br>---- | 42.0 |

Note. All tables shown in this section show the raw number of students. The column percentages are calculated by dividing the number of students for each learning style earning a particular grade by the total number of students receiving the same grade.

For the course Principles of Management, those students possessing the Converger learning style earned the greatest

percentage of A's (29%), as shown in Table 2. In fact, 100% of all Convergers received A's. Clearly, this was the most advantageous learning style for receiving A's. As defined earlier, Convergers perceived abstractly and processed actively, as shown in Appendix C. Those students possessing the learning style called Accommodators had 25.8% of the A's, the second greatest percentage of A's. Assimilators had the highest percentage of students receiving B's and C's with 41.6% (5/12).

**Table 3**

**GRADE PERFORMANCE BY LEARNING STYLE FOR BUSINESS LAW**

**Grade Performance**

| Learning Style | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Diverger | 7.0<br>22.6% | 6.0<br>35.3% | 3.0<br>50.0% | 1.0<br>100.0% | 17.0 |
| Assimilator | 6.0<br>19.3% | 6.0<br>35.3% | 2.0<br>33.3% | ----<br>---- | 14.0 |
| Converger | 10.0<br>32.3% | 1.0<br>5.9% | ----<br>---- | ----<br>---- | 11.0 |
| Accommodator | 8.0<br>25.8% | 4.0<br>23.5% | 1.0<br>16.7% | ----<br>---- | 13.0 |
| Totals<br>% by Column | 31.0<br>100.0% | 17.0<br>100.0% | 6.0<br>100.0% | 1.0<br>100.0% | 55.0 |

In Business Law, Convergers again had the highest raw score (10) and the highest percentage (32.3%) of A's as indicated in Table 3. As in Principles of Management, Accommodators came in second with 25.8% of all A's. Proportionately, 91% (10/11) of all Convergers received A's

in Business Law. Just as in Principles of Management, the two learning styles that included the "active" processing dimension (Convergers and Accommodaters) contained the highest percentage of A's with 58.1% (32.3% + 25.8%). Divergers had the highest percentage of students with grades of B and below, 58.9% (10/17), followed by Assimilators with 57.1% (8/14), as shown in Table 3.

**Table 4**

**GRADE PERFORMANCE BY LEARNING STYLE FOR INTERMEDIATE ACCOUNTING**

**Grade Performance**

| Learning Style | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Diverger | 6.0<br>20.0% | 7.0<br>36.8% | 3.0<br>37.5% | 1.0<br>33.3% | 17.0 |
| Assimilator | 8.0<br>26.6% | 3.0<br>15.7% | 3.0<br>37.5% | 1.0<br>33.3% | 15.0 |
| Converger | 9.0<br>30.0% | 2.0<br>10.7% | 1.0<br>12.5% | ----<br>---- | 12.0 |
| Accommodator | 7.0<br>23.4% | 7.0<br>36.8% | 1.0<br>12.5% | 1.0<br>33.4% | 16.0 |
| Totals<br>% by Column | 30.0<br>100.0% | 19.0<br>100.0% | 8.0<br>100.0% | 3.0<br>100.0% | 60.0 |

For the third course under study, Intermediate Accounting, the percentage spread of A's by learning style was very close (see Table 4). Following the same pattern shown by earlier courses, Convergers had 30% of the A's

earned, followed by 26.6% for the Assimilator learning style. Those learning styles that perceived abstractly (Assimilators and Convergers) possessed the highest percentage of A's, 56.6% (26.6% + 30%). Those students with the learning style Divergers experienced the lowest percentage of A's, 20% (see Table 4), and the highest student percentage in the B to F grade ranges, 64.7% (11/17).

**Table 5**

**GRADE PERFORMANCE BY LEARNING STYLE FOR PRINCIPLES OF ECONOMICS**

**Grade Performance**

| Learning Style | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Diverger | 7.0<br>21.9% | 7.0<br>41.1% | 3.0<br>37.5% | 1.0<br>50.0% | 18.0 |
| Assimilator | 8.0<br>25.0% | 3.0<br>17.6% | 4.0<br>50.0% | ----<br>---- | 15.0 |
| Converger | 9.0<br>28.1% | 2.0<br>11.9% | 1.0<br>12.5% | ----<br>---- | 12.0 |
| Accommodator | 8.0<br>25.0% | 5.0<br>29.4% | ----<br>---- | 1.0<br>50.0% | 14.0 |
| Total<br>% by Column | 32.0<br>100.0% | 17.0<br>100.0% | 8.0<br>100.0% | 2.0<br>100.0% | 59.0 |

As presented in Table 5, those learning styles exhibiting abstract perception--Assimilators and Convergers--when combined, contained the highest percentage of A's, 53% (25% + 28.1%), in the Principles of Economics courses. As

in Principles of Management, Business Law, and Intermediate Accounting, the Converger learning style received 28.1% of the A's, the highest percentage, while the Accommodators and Assimilators had 25% each. However, proportionately, Accommodators had the highest combined percentage of A's and B's with 92.8% (13/14) of all students testing for this learning style. Convergers were a close second with 91.6% (11/12) of all A's and B's, falling within this learning style. Following the same pattern for Business Law and Intermediate Accounting, Divergers earned 21.9% of the A's, the lowest percentage for all learning styles. Divergers also experienced the highest number (11) and the highest percentage of students, 61% (11/18), in the B to F grade ranges.

Thus, for this study, there appeared to be a direct tendency between the learning style Converger and high academic achievement in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. Generally, there appeared to be an inverse tendency between the learning style Diverger and academic achievement in the courses under study.

The second purpose of this study was to discover if tendencies existed between brain hemispheric dominance and final grades earned in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics

(Macro and Micro). Left-brained students showed an advantage in earning A's in Principles of Management, Intermediate Accounting, and Principles of Economics. However, in Business Law students who were whole brained earned the highest percentage of A's, and in the other three courses under study earned the second greatest percentage of A's. Right-brained people earned the lowest percentage of A's in each course under study, and was the brain dominance mode that had the highest percentage of students in the B to F grade ranges for each course. In this study students who had right hemispheric dominance appeared to be at a disadvantage in earning higher grades.

**Table 6**

**GRADE PERFORMANCE BY BRAIN HEMISPHERIC DOMINANCE IN PRINCIPLES OF MANAGEMENT**

**Grade Performance**

| Brain Dominance | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Left | 15.0<br>48.3% | 1.0<br>12.5% | 1.0<br>33.3% | ----<br>---- | 17.0 |
| Whole | 11.0<br>35.5% | 4.0<br>50.0% | 1.0<br>33.0% | ----<br>---- | 16.0 |
| Right | 5.0<br>16.2% | 3.0<br>37.5% | 1.0<br>33.4% | ----<br>---- | 9.0 |
| Totals<br>% by Columns | 31.0<br>100.0% | 8.0<br>100.0% | 3.0<br>100.0% | ----<br>---- | 42.0 |

In Principles of Management left-brained students earned the highest percentage of A's (48.3%), while whole brained students obtained 35.3% of the A's given as shown in Table 6. Students who were right hemispheric dominant received the smallest percentage of A's (16.2%). Forty-four percent (4/9) of all right-brained students fell in the B to F grade

ranges, while 88.2% (15/17) of all left-brained students received A's in Principles of Management.

**Table 7**

**GRADE PERFORMANCE BY BRAIN HEMISPHERIC DOMINANCE IN INTERMEDIATE ACCOUNTING**

**Grade Performance**

| Brain Dominance | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Left | 16.0<br>53.3% | 3.0<br>16.6% | 2.0<br>22.3% | ----<br>---- | 21.0 |
| Whole | 13.0<br>43.3% | 6.0<br>33.4% | 3.0<br>33.3% | 2.0<br>100.0% | 24.0 |
| Right | 1.0<br>3.4% | 9.0<br>50.0% | 4.0<br>44.4% | ----<br>---- | 14.0 |
| Totals<br>% by Column | 30.0<br>100.0% | 18.0<br>100.0% | 9.0<br>100.0% | 2.0<br>100.0% | 59.0 |

For Intermediate Accounting as presented in Table 7 left hemispheric dominant students earned the greatest percentage of A's, 53.3%, and 76.6% (16/21) of all left-brained students received A's. Whole brained students followed with 43.3% of all A's.

There was a decided grade disadvantage in Intermediate Accounting if a student was right-brained. Right

hemispheric dominant students received a minute 3.4% of all A's, and 92.8% (13/14) of all right-brained students fell below the A range in Intermediate Accounting.

**Table 8**

**GRADE PERFORMANCE BY BRAIN HEMISPHERIC DOMINANCE IN PRINCIPLES OF ECONOMICS**

**Grade Performance**

| Brain Dominance | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Left | 15.0<br>46.9% | 4.0<br>23.5% | 3.0<br>42.9% | ----<br>---- | 22.0 |
| Whole | 11.0<br>34.3% | 8.0<br>47.1% | 3.0<br>42.9% | 1.0<br>50.0% | 23.0 |
| Right | 6.0<br>18.8% | 5.0<br>29.4% | 1.0<br>14.2% | 1.0<br>50.0% | 13.0 |
| Totals<br>% by Column | 32.0<br>100.0% | 17.0<br>100.0% | 7.0<br>100.0% | 2.0<br>100.0% | 58.0 |

Following the pattern set in Principles of Management and Intermediate Accounting, left-brained students received 46.9% of the A's in Principles of Economics, the largest percentage for any brain dominance category, as presented in Table 8. In addition, 68.2% (15/22) of the left hemispheric dominant students earned A's in Principles of Economics, the greatest percentage for any category of brain dominance

group. Again, right-brain students earned the lowest percentage of A's, 18.8%, of any brain dominance mode in Principles of Economics, and had the largest percentage of students in the B to F grade categories, 53.8% (7/13), for this course. However, 52.1% (12/23) of whole brained students also fell below the A grade range in Principles of Economics.

**Table 9**

**GRADE PERFORMANCE BY BRAIN HEMISPHERIC DOMINANCE FOR BUSINESS LAW**

**Grade Performance**

| Brain Dominance | A | B | C | D-F | Totals |
|---|---|---|---|---|---|
| Left | 7.0<br>28.0% | 5.0<br>29.4% | 2.0<br>40.0% | 1.0<br>50.0% | 15.0 |
| Whole | 12.0<br>48.0% | 7.0<br>41.2% | 1.0<br>20.0% | 1.0<br>50.0% | 21.0 |
| Right | 6.0<br>24.0% | 5.0<br>29.4% | 2.0<br>40.0% | ----<br>---- | 13.0 |
| Totals<br>% by Column | 25.0<br>100.0% | 17.0<br>100.0% | 5.0<br>100.0% | 2.0<br>100.0% | 49.0 |

Business Law was an exception to the pattern noted in Principles of Management, Intermediate Accounting, and Principles of Economics where left-brain students received the greatest percentage of A's. As shown in Table 9, whole brained students earned the largest percentage of A's in Business Law with 48%, well above the 28% of the A's

received by the left hemispheric dominant students. Right hemispheric dominant students still experienced the smallest percentage of A's with 24%, and still had the greatest percentage of students receiving grades lower than A's, 53.8% (7/13).

After surveying the study's results for brain dominance, there appeared to be a direct tendency between left hemispheric dominance and high academic achievement in Principles of Management, Intermediate Accounting, and Principles of Economics. There appeared to be a direct tendency between being whole brained and receiving A's in Business Law. However, it appeared there was an inverse tendency between right hemispheric dominant students and lower academic achievement (earning grades B to F) in Principles of Management, Intermediate Accounting, Principles of Economics, and Business Law.

# CHAPTER V

## Discussion and Recommendations

In this chapter the results of the study were evaluated, interpreted, and qualified. The purpose of this study was to determine if tendencies existed between learning styles and academic achievement, and brain hemispheric dominance and academic performance in the courses of Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics (Macro and Micro). Because the literature review yielded no direct answers to the research questions, no discussion of the literature review in light of the test results was necessary.

As noted in the "Results" section in Chapter IV, there appeared to be a direct tendency between the Converger learning style (see Appendix C) and high academic achievement in all courses under study. McCarthy (1987) noted Convergers ". . . take in experience abstractly and then process what they take in actively" (p. 23). Convergers were interested in taking theories, conducting experiments, and determining how theories work. In business and accounting courses leading to an accounting degree, theories were considered an integral part of the courses under study. Abstract perceiving was needed to understand how theories work and to apply them. Therefore, it was not

surprising that students with the learning style Converger--where data was perceived abstractly--appeared to have higher academic achievement in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. In addition, Convergers were also described as pragmatic, down-to-earth, and skills oriented (McCarthy, 1987). Courses like those studied included practical, job-oriented knowledge, and skills used immediately in employment. Thus, Convergers should do well in the practical problems and exercises of these courses (Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics). The study results appeared to concur.

Individuals with learning styles (Convergers and Assimilators) that employ abstract perception received the greatest percentage of A grades in all courses when their results were combined and compared to those learning styles (Divergers and Accommodators) which perceived concretely. (See Appendix C where all learning styles were described in greater detail). Again, this result was predictable because students needed abstract perception to understand the theory component of Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics.

However, the puzzling part of the learning style dimension was the indifferent performance of those students having the Assimilator learning style. Assimilators

perceived abstractly and processed reflectively by watching. Schools were made for students possessing this learning style (McCarthy, 1987). However, in this study's results, Assimilators' grade performance in Principles of Management, Intermediate Accounting, Business Law, and Principles of Economics was average when compared to other learning styles. There were no direct or inverse tendencies observed between the Assimilator learning style and academic achievement in the courses under study. As discussed in the Results section of Chapter IV, there appeared to be an inverse tendency between the Diverger learning style and academic performance in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. Divergers perceived information concretely and processed it actively. Thus, it should be expected that Divergers would have difficulty with the strong theory component of the courses under study that require abstract processing abilities. Consequently, Divergers' poor academic performance with the smallest percentage of A's, but the greatest percentage of students in the B to F ranges, was understandable.

The second research question asked if relationships existed between brain hemispheric dominance and final grades earned in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. Left

hemispheric dominant students received the greatest percentage of A's in Principles of Management, Intermediate Accounting, and Principles of Economics. These results were expected. Left-brain students (see Appendix B) are known to be rational, analytical, and objective. They preferred multiple choice tests (McCarthy, 1987). Course tests for Principles of Management, Intermediate Accounting, and Principles of Economics included a large multiple choice component, essay questions, and objective problem-solving. Therefore, students who possessed the ability to think rationally, analytically, and objectively--left-brained students--were predicted the better performers in these courses. The study provided evidence to prove this premise.

In addition, the study appeared to indicate an inverse tendency between right hemispheric dominance and academic achievement in all courses under study. Right-brained students had the lowest percentage of A's, especially in Intermediate Accounting, and the highest percentage of students falling in the B to F grade ranges. These results were predictable. Right-brained students are described as intuitive, subjective, and emotional (McCarthy, 1987). Students who possessed these characteristics could have a difficult time understanding the course material in the courses under study (see Appendix B for a more detailed explanation of right and left mode processing).

The surprising result of the brain hemispheric study was that whole-brained students received the greatest percentage of A's in Business Law. This result was unexpected. Perhaps one explanation is that students in the Business Law course learned and were tested by the case method. Thus, students needed to think logically and rationally (left-brain processing) in determining applicable rules of law, but also had to synthesize and make subjective assessments (right-brain processing) in blending rules of law and applying justice to test cases.

## Recommendations

The results of this study support several recommendations. The study appears to indicate that an inverse tendency exists between those students possessing the Diverger learning style and academic performance in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. In addition, this study indicates that those students who are right hemispheric dominant appear to earn lower grades in the courses under study than those students who are left brained and whole brained.

Post-secondary business and accounting instructors who teach Principles of Management, Intermediate Accounting, Business Law, and Principles of Economics should receive

training in administering and interpreting the results of the Kolb Learning Style Inventory (Kolb, 1985) and the McCarthy Hemispheric Mode Indicator (McCarthy, 1986). The goal of training post-secondary business and accounting instructors to use the learning style inventory and hemispheric mode indicator would be to identify and help those students who possess the Diverger learning style or are right hemispheric dominant, and are earning lower grades in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. Divergers perceive information concretely and process it actively. Instructors can assign additional exercises, problems, and cases in the courses under study that would provide concrete learning experiences to help Divergers master course knowledge. Instructors can assign cases, practice sets, and problems to students who are right hemispheric dominant to help them learn the course material in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics. Cases and practice sets assist right brained students to integrate concepts and principles, and get "the big picture." Accounting practice sets are especially helpful to students in integrating accounting terminology and concepts.

Another recommendation emerging from this study is to expand the number of community colleges and four-year

colleges and universities participating in this study to determine whether study results hold true in a larger student population. Only second-year accounting students at Northeast Iowa Community College are included in this study. Because direct and inverse tendencies appear to exist between learning styles and academic achievement and brain hemispheric dominance and academic performance in Principles of Management, Business Law, Intermediate Accounting, and Principles of Economics, further research including accounting students at other community colleges and four-year colleges and universities would prove interesting to see if similar results are obtained in a larger population of students.

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# APPENDIX A

# KOLB LEARNING STYLE INVENTORY

# LSI

Learning-Style Inventory

Name _____

Date _____

McBer and Company

Inventory

**McBer and Company**
137 Newbury Street
Boston, Massachusetts 02116
(617) 437-7080



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# Learning-Style Inventory: Instructions



The Learning-Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. Below are 12 sentences with a choice of four endings. Rank the endings for each sentence according to how well you think each one fits with how *you* would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn *best*, down to a "1" for the sentence ending that seems *least* like the way you would learn. Be sure to rank all the endings for each sentence unit. Please do not make ties.

**Example of completed sentence set:**

| | | | | |
|---|---|---|---|---|
| 0. When I learn | 4 I am happy. | 1 I am fast | 2 I am logical. | 3 I am careful. |

| | | | | |
|---|---|---|---|---|
| 1. When I learn | ____ I like to deal with my feelings. | ____ I like to watch and listen. | ____ I like to think about ideas. | ____ I like to be doing things. |
| 2. I learn best when: | ____ I trust my hunches and feelings. | ____ I listen and watch carefully. | ____ I rely on logical thinking. | ____ I work hard to get things done. |
| 3. When I am learning: | ____ I have strong feelings and reactions. | ____ I am quiet and reserved. | ____ I tend to reason things out. | ____ I am responsible about things. |
| 4. I learn by: | ____ feeling. | ____ watching. | ____ thinking. | ____ doing. |
| 5. When I learn: | ____ I am open to new experiences. | ____ I look at all sides of issues. | ____ I like to analyze things, break them down into their parts. | ____ I like to try things out. |
| 6. When I am learning: | ____ I am an intuitive person. | ____ I am an observing person. | ____ I am a logical person. | ____ I am an active person. |
| 7. I learn best from: | ____ personal relationships. | ____ observation. | ____ rational theories. | ____ a chance to try out and practice. |
| 8. When I learn: | ____ I feel personally involved in things. | ____ I take my time before acting. | ____ I like ideas and theories. | ____ I like to see results from my work. |
| 9. I learn best when: | ____ I rely on my feelings. | ____ I rely on my observations. | ____ I rely on my ideas. | ____ I can try things out for myself. |
| 10. When I am learning: | ____ I am an accepting person. | ____ I am a reserved person. | ____ I am a rational person. | ____ I am a responsible person. |
| 11. When I learn: | ____ I get involved. | ____ I like to observe. | ____ I evaluate things. | ____ I like to be active. |
| 12. I learn best when: | ____ I am receptive and open-minded. | ____ I am careful. | ____ I analyze ideas. | ____ I am practical. |

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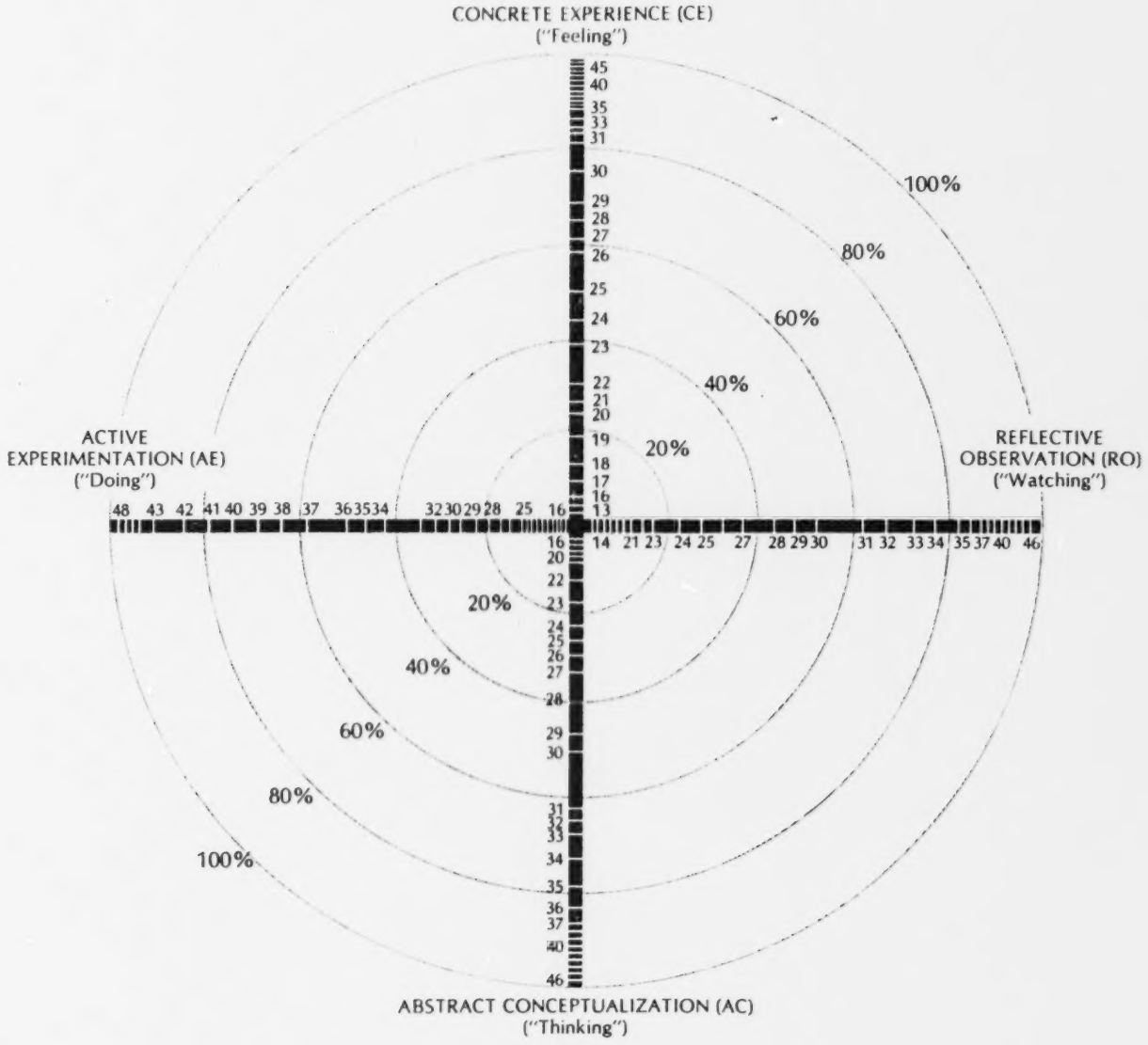




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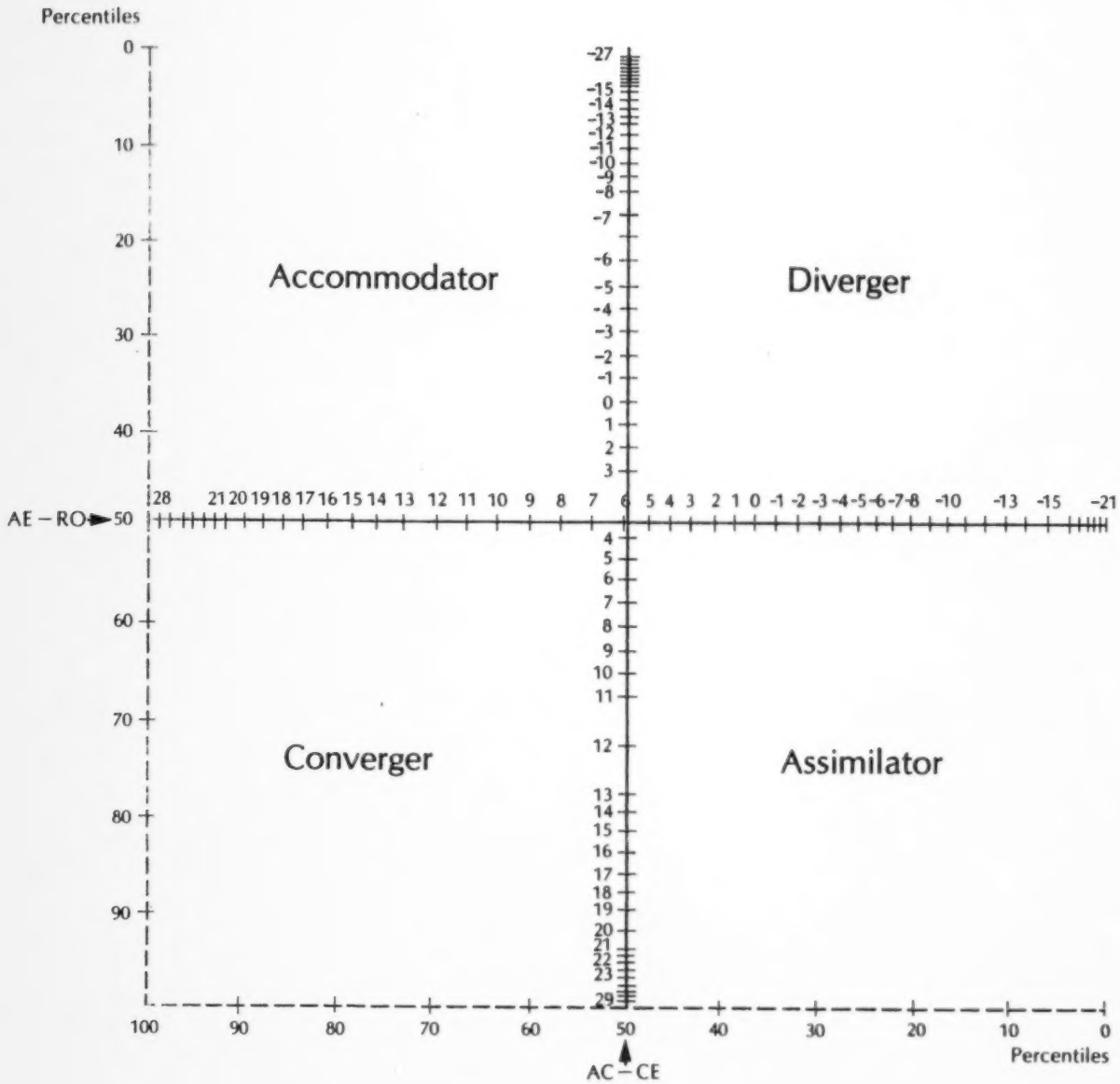




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# APPENDIX B

## McCARTHY HEMISPHERIC MODE INDICATOR

# HEMISPHERIC MODE INDICATOR (HMI)

## Right and left brain approaches to learning



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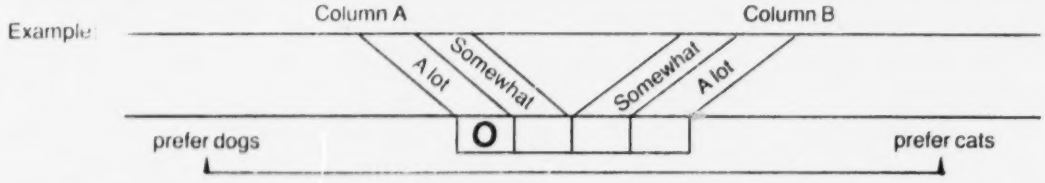
200 W. Station St.
Barrington, IL 60010 312/382-7272
Bernice McCarthy, Ph.D., Director

# HEMISPHERIC MODE INDICATOR (HMI)

INSTRUCTIONS: For each numbered item there are four possible choices. Either choose "a lot" or "somewhat" from the column A side, or "a lot" or "somewhat" from the column B side. For example: I prefer dogs "a lot" or "somewhat" – or – I prefer cats "a lot" or "somewhat." Choose one answer for each numbered item. Place an O in the appropriate blank.




| Column A | A lot | Somewhat | Somewhat | A lot | Column B |
|---|---|---|---|---|---|
| 1. bases decisions on facts | | | | | bases decisions on feelings |
| 2. prefers organized structure in a work setting | | | | | prefers open-ended work setting |
| 3. carefree, spontaneous | | | | | careful, deliberate |
| 4. understands how the pieces fit together | | | | | understands from experience |
| 5. tries hunches | | | | | approaches problems logically |
| 6. like an athlete or artist | | | | | like an accountant or chemist |
| 7. like a tax lawyer | | | | | like a criminal lawyer |
| 8. neat | | | | | sloppy |
| 9. process oriented | | | | | product oriented |
| 10. improvising new ideas | | | | | thoughtful, both feet on the ground |
| 11. prefers change and the unusual | | | | | prefers order and stability |
| 12. recalls information, names | | | | | recalls faces, dress, actions |
| 13. precise in language | | | | | free, sweeping terms |
| 14. focus on words said and the message | | | | | takes in body language, emotional tone |
| 15. holistic, intuitive | | | | | orderly, sequential |
| 16. words and numbers | | | | | space and form |
| 17. synthesizing | | | | | analyzing |
| 18. abstract | | | | | concrete |
| 19. emotional | | | | | rational |
| 20. objective | | | | | subjective |
| 21. waking | | | | | dreaming |
| 22. timebound | | | | | timeless |
| 23. realistic | | | | | idealistic |
| 24. lead by the heart | | | | | lead by the mind |
| 25. specific | | | | | ambiguous |
| 26. community | | | | | agency |
| 27. outlook | | | | | insight |
| 28. cause and effect | | | | | resemblances |
| 29. lumper | | | | | splitter |
| 30. intellectual rigor | | | | | imagination |
| 31. soft | | | | | sharp |
| 32. persist | | | | | encompass |

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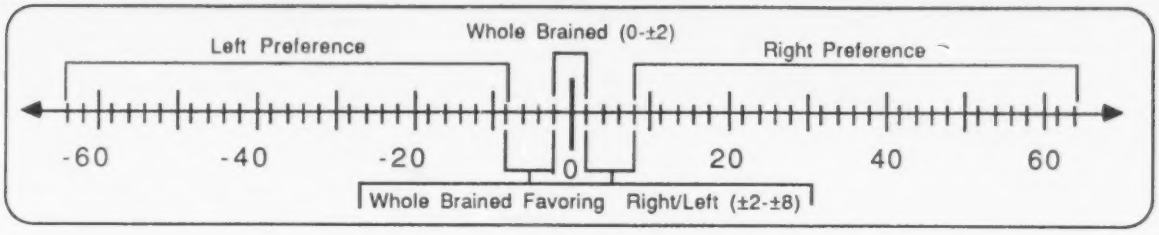
# HEMISPHERIC MODE INDICATOR SCORING KEY




| | Column A | | Column B | |
|---|---|---|---|---|
| 1. | −2 | −1 | +1 | +2 |
| 2. | −2 | −1 | +1 | +2 |
| 3. | +2 | +1 | −1 | −2 |
| 4. | −2 | −1 | +1 | +2 |
| 5. | +2 | +1 | −1 | −2 |
| 6. | +2 | +1 | −1 | −2 |
| 7. | −2 | −1 | +1 | +2 |
| 8. | −2 | −1 | +1 | +2 |
| 9. | +2 | +1 | −1 | −2 |
| 10. | +2 | +1 | −1 | −2 |
| 11. | +2 | +1 | −1 | −2 |
| 12. | −2 | −1 | +1 | +2 |
| 13. | −2 | −1 | +1 | +2 |
| 14. | −2 | −1 | +1 | +2 |
| 15. | +2 | +1 | −1 | −2 |
| 16. | −2 | −1 | +1 | +2 |
| 17. | +2 | +1 | −1 | −2 |
| 18. | −2 | −1 | +1 | +2 |
| 19. | +2 | +1 | −1 | −2 |
| 20. | −2 | −1 | +1 | +2 |
| 21. | −2 | −1 | +1 | +2 |
| 22. | −2 | −1 | +1 | +2 |
| 23. | −2 | −1 | +1 | +2 |
| 24. | +2 | +1 | −1 | −2 |
| 25. | −2 | −1 | +1 | +2 |
| 26. | +2 | +1 | −1 | −2 |
| 27. | +2 | +1 | −1 | −2 |
| 28. | −2 | −1 | +1 | +2 |
| 29. | +2 | +1 | −1 | −2 |
| 30. | −2 | −1 | +1 | +2 |
| 31. | +2 | +1 | −1 | −2 |
| 32. | −2 | −1 | +1 | +2 |

1.) Total all the minus numbers.

Total minus = _____

2.) Total all the plus numbers.

Total plus = _____

3.) Compute the difference.

= [ ]

4.) Mark your score above.



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## RIGHT/LEFT MODE CHARACTERISTICS

LEFT MODE

Rational
Responds to verbal instructions
Controlled, systematic experiments
Problem solves by logically and sequentially looking at the parts of things
Makes objective judgements
Looks at differences
Is planned and structured
Prefers established, certain information
Analytic reader
Primary reliance on language on thinking and remembering
Prefers talking and writing
Prefers multiple choice tests
Controls feelings
Responsive to structure of environment
Prefers hierarchial (ranked) authority structures

Sequential
Is a splitter: distinction important
Talks, and talks, and talks
Is logical, sees cause and effect

Draws on previously accumulated, organized information

RIGHT MODE

Intuitive
Responds to demonstrated instructions
Open-ended, random experiments
Problem solves with hunches, looking for patterns and configurations
Makes subjective judgements
Looks at similarities
Is fluid and spontaneous
Prefers elusive, uncertain information
Synthesizing
Primary reliance on images in thinking and remembering
Prefers drawing and manipulating objects
Prefers open-ended questions
Free with feelings
Essentially self-acting
Prefers collegial (participative) authority structures

Simultaneous
Is a lumper: connectedness important
Is mute - uses pictures, not words
Is analogic, sees correspondences, resemblances

Draws on unbounded qualitative patterns that are not organized into sequences, but that cluster around images of crystallized feelings

# APPENDIX C

## DESCRIPTION OF LEARNING STYLES

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DIVERGER

# TYPE ONE LEARNERS

Perceive information concretely and process it reflectively. They integrate experience with the self. They learn by listening and sharing ideas. Are imaginative thinkers who believe in their own experience. They excel in viewing direct experience from many perspectives. They value insight thinking. They work for harmony. They need to be personally involved, seek commitment. Are interested in people and culture. They are thoughtful people who enjoy observing other people. They absorb reality; they seem to take in the atmosphere almost like osmosis.

They seek meaning and clarity.

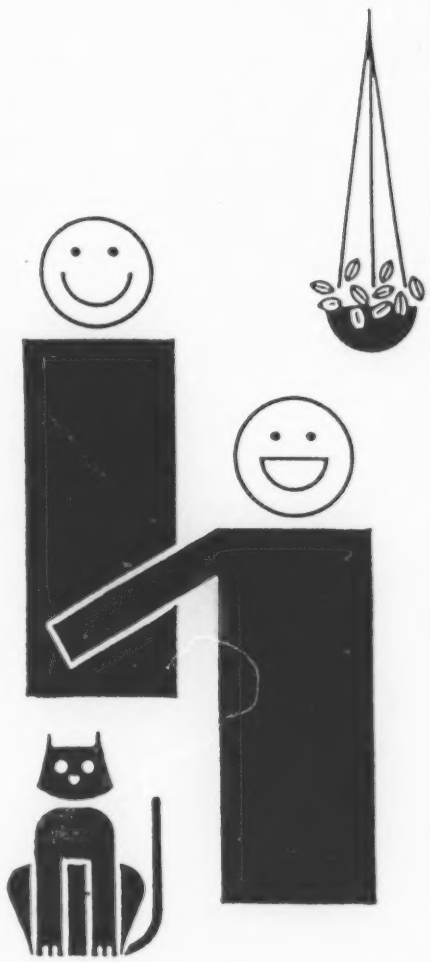
As leaders they:

- thrive on taking the time to develop good ideas,
- tackle problems by reflecting alone and then brainstorming with staff,
- lead by their heart, involving other people in decision making
- exercise authority with trust and participation,
- work for organizational solidarity
- need staff who are supportive and share their sense of mission.

As teachers they:

- are interested in facilitating individual growth,
- try to help people become more self aware,
- believe curricula should enhance one's ability to be authentic,
- see knowledge as enhancing personal insights,
- encourage authenticity in people,
- like discussions, group work, and realistic feedback about feelings,
- are caring people who seek to engage their students in cooperative efforts,
- are aware of social forces that affect human development,
- are able to focus on meaningful goals,
- tend to become fearful under pressure and sometimes lack daring.

| | |
|---|---|
| STRENGTH: | Innovation and ideas |
| FUNCTION BY: | Value clarification |
| GOALS: | To be involved in important issues and to bring harmony |
| FAVORITE QUESTION: | WHY? |



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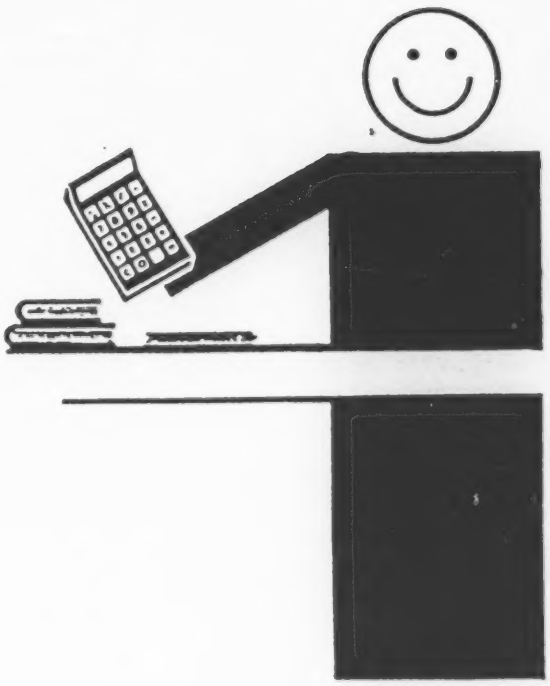
ASSIMILATOR

# TYPE TWO LEARNERS

Perceive information abstractly and process it reflectively. They form theory and concepts by integrating their observations into what is known. They seek continuity. They need to know what the experts think. They learn by thinking through ideas. They value sequential thinking. Need details. They critique information and collect data. They are thorough and industrious. They will reexamine the facts if situations perplex them. They enjoy traditional classrooms. Schools are made for them. They are more interested in ideas than in people. They prefer to maximize certainty, and they are uncomfortable with subjective judgments.



They seek goal attainment and personal effectiveness.

As leaders they:

- thrive on assimilating disparate facts into coherent theories,
- tackle problems with rationality and logic,
- lead by principles and procedures,
- exercise authority with assertive persuasion, by knowing the facts,
- work to enhance their organization as embodiment of tradition and prestige,
- need staff who are well organized, have things down on paper, and follow through on agreed decisions.

As teachers they:

- are interested in transmitting knowledge,
- try to be as accurate and knowledgeable as possible,
- believe curricula should further understanding of significant information and should be presented systematically,
- see knowledge as deepening comprehension,
- encourage outstanding students,
- like facts and details, organizational and sequential thinking,
- are traditional teachers who seek to imbue a love of precise knowledge,
- believe in the rational use of authority,
- tend to discourage creativity by a dominating attitude.

| | |
|---|---|
| STRENGTH: | Creating concepts and models |
| FUNCTION BY: | Thinking things through |
| GOALS: | Intellectual recognition |
| FAVORITE QUESTION: | WHAT? |

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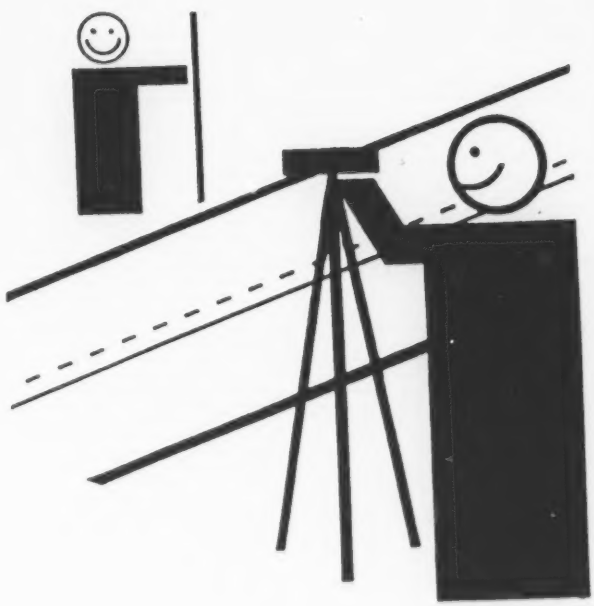
CONVERGER

# TYPE THREE LEARNERS

Perceive information abstractly and process it actively. Integrate theory and practice. Learn by testing theories and applying common sense. They are pragmatists, they believe if something works, use it. They are down-to-earth problem solvers, who resent being given answers. They do not stand on ceremony, but get right to the point. They have a limited tolerance for fuzzy ideas. They value strategic thinking. They are skills-oriented. They experiment and tinker with things. They need to know how things work. They edit reality, cut right to the heart of things. Sometimes they seem bossy and impersonal.



They seek utility and results.

As leaders they:

- thrive on plans and time lines,
- tackle problems by making unilateral decisions,
- lead by personal forcefulness, inspiring quality,
- exercise authority by reward/punishment, (the fewer the rules, the better, but enforce them),
- work hard to make their organization productive and solvent,
- need staff who are task-oriented and move quickly.

As teachers they:

- are interested in productivity and competence,
- try to give students the skills they will need in life,
- believe curricula should be geared to competencies and economic usefulness,
- see knowledge as enabling students to be capable of making their own way,
- encourage practical applications,
- like technical skills and hands-on activities,
- believe the best way is determined scientifically,
- use measured rewards,
- tend to be inflexible and self-contained,
- lack team-work skills.

| | |
|---|---|
| STRENGTH: | Practical application of ideas |
| FUNCTION BY: | Factual data garnered from kinesthetic, hands-on experience |
| GOALS: | To bring their view of the present into line with future security |
| FAVORITE QUESTION: | HOW DOES THIS WORK? |

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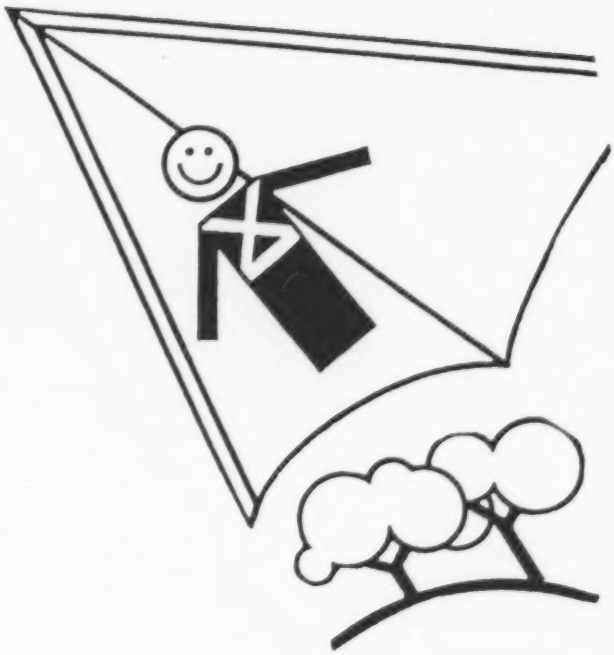
ACCOMMODATOR

# TYPE FOUR LEARNERS

Perceive information concretely and process it actively. Integrate experience and application. Learn by trial and error. Are believers in self-discovery. Are enthusiastic about new things. Are adaptable, even relish change. They excel when flexibility is needed. Often reach accurate conclusions in the absence of logical justification. Are risk takers. Are at ease with people. They enrich reality by taking what is and adding to it. Sometimes seen as manipulative and pushy.



They seek to influence.

As leaders they:

- thrive on crisis and challenge,
- tackle problems by looking for patterns, scanning possibilities,
- lead by energizing people,
- exercise authority by holding up visions of what might be,
- work hard to enhance their organization's reputation as a front runner,
- need staff who can follow-up and implement details.

As teachers they:

- are interested in enabling student self-discovery,
- try to help people act on their own visions,
- believe curricula should be geared to learners' interests and inclinations,
- see knowledge as necessary for improving the larger society,
- encourage experiential learning,
- like variety in instructional methods,
- are dramatic teachers who seek to energize their students,
- attempt to create new forms, to stimulate life,
- are able to draw new boundaries
- tend to rashness and manipulation.

| | |
|---|---|
| STRENGTH: | Action, getting things done |
| FUNCTION BY: | Acting and testing experience |
| GOALS: | To bring action to ideas |
| FAVORITE QUESTION: | IF? |



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